

IEEE C95.1
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47 C.F.R. Part 1, Subpart I, Section 1.1310
47 C.F.R. Part 2, Subpart J, Section 2.1091

RF EXPOSURE REPORT

For

Data Collection Computer

Model: CV31A

Trade Name: Honeywell

Issued to

Honeywell International Inc
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Issued by

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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	2014/05/24	Initial Issue	ALL	Angel Cheng
01	2015/12/21	Rev. (01)	ALL	Doris Chu

Rev. (01)

1. Applicant updates standard.
2. Other information, please refer to the T140430W01 and this test report.

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1. LIMIT

According to §15.247(i), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See § 1.1307(b)(1) of this chapter.

2. EUT SPECIFICATION

EUT	Data Collection Computer
Model	CV31A
Trade Name	Honeywell
Frequency band (Operating)	<input checked="" type="checkbox"/> Bluetooth 2.1 + EDR / 4.0: 2402 ~ 2480 MHz 802.11b/g/n HT20: 2412MHz ~ 2462MHz 802.11a: 5180 ~ 5700MHz / 5745 ~ 5825MHz 802.11 HT20: 5180 ~ 5700MHz / 5745 ~ 5825MHz <input type="checkbox"/> Others
Device category	<input type="checkbox"/> Portable (<20cm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others
Exposure classification	<input type="checkbox"/> Occupational/Controlled exposure (S = 5mW/cm ²) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm ²)
Antenna Specification	5GHz: Antenna Gain : 5.00 dBi (Numeric gain 3.16) 2.4GHz: Antenna Gain : 3.00 dBi (Numeric gain 2.00)
Maximum Average output power	Bluetooth Mode : 6.92 dBm (4.920 mW) IEEE 802.11b Mode: 18.73 dBm (74.645 mW) IEEE 802.11g Mode: 14.55 dBm (28.510 mW) IEEE 802.11n HT 20 Mode: 14.45 dBm (27.861 mW) IEEE 802.11a Mode: 14.41 dBm (27.606 mW) IEEE 802.11n HT20 Mode: 14.38 dBm (27.416 mW)
Maximum Tune up Power	Bluetooth Mode : 8.50 dBm (7.079 mW) IEEE 802.11b Mode: 20.00 dBm (100.000 mW) IEEE 802.11g Mode: 16.00 dBm (39.811 mW) IEEE 802.11n HT 20 Mode: 16.00 dBm (39.811 mW) IEEE 802.11a Mode: 16.00 dBm (39.811 mW) IEEE 802.11n HT20 Mode: 16.00 dBm (39.811 mW)
Evaluation applied	<input checked="" type="checkbox"/> MPE Evaluation* <input type="checkbox"/> SAR Evaluation <input type="checkbox"/> N/A

3. TEST RESULTS

No non-compliance noted.

Calculation

Given $E = \frac{\sqrt{30 \times P \times G}}{d}$ & $S = \frac{E^2}{377}$

Where E = Field strength in Volts / meter

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{377d^2}$$

Changing to units of mW and cm, using:

$$P \text{ (mW)} = P \text{ (W)} / 1000 \text{ and}$$

$$d \text{ (cm)} = d \text{ (m)} / 100$$

Yields

$$S = \frac{30 \times (P/1000) \times G}{377 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2} \quad \textbf{Equation 1}$$

Where d = Distance in cm

P = Power in mW

G = Numeric antenna gain

S = Power density in mW / cm²

4. MAXIMUM PERMISSIBLE EXPOSURE

Substituting the MPE safe distance using $d = 20$ cm into Equation 1:

$$S = 0.000199 \times P \times G$$

Where P = Power in mW

G = Numeric antenna gain

S = Power density in mW / cm²

Bluetooth mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
0	2402	7.079	2	20	0.0028	1

IEEE 802.11b mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
1	2412	100.000	2	20	0.0398	1

IEEE 802.11g mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
1	2412	39.811	2	20	0.0158	1

IEEE 802.11n HT20 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
1	2412	39.811	2	20	0.0158	1

IEEE 802.11a mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
140	5700	39.811	3.16	20	0.0250	1

IEEE 802.11a HT20 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
140	5700	39.811	3.16	20	0.0250	1